ACT–F4M32A High Speed 128 Megabit Sector Erase FLASH Multichip Module

Advanced

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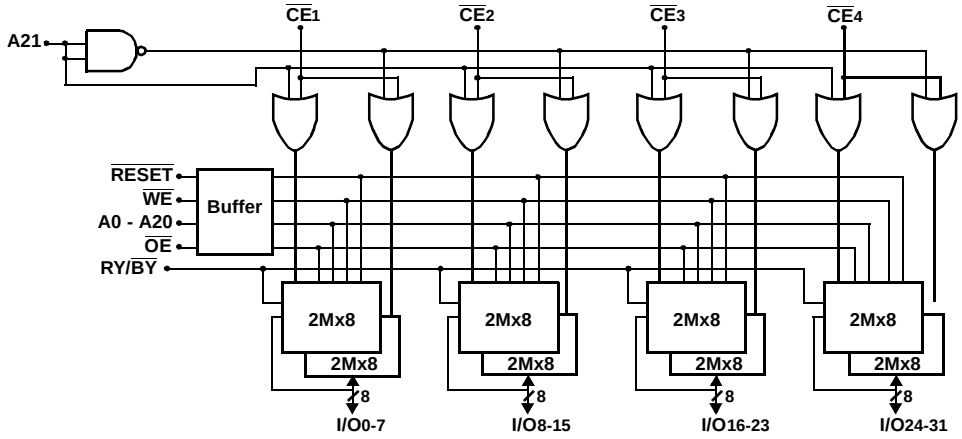
www.aeroflex.com/act1.htm

Features

- 8 Low Voltage/Power AMD 2M x 8 FLASH Die in One MCM Package
- Overall Configuration is 4M x 32
- +5V Power Supply / +5V Programing Operation
- Access Times of 100, 120 and 150 ns
- Erase/Program Cycles – 100,000 Minimum (+25°C)
- Sector erase architecture (Each Die)
  - 32 uniform sectors of 64 Kbytes each
  - Any combination of sectors can be erased. Also supports full chip erase
  - Sector group protection is user definable
- Embedded Erase Algorithims – Automatically pre-programs and erases the die or any sector
- Embedded Program Algorithims – Automatically programs and verifies data at specified address
- Ready/$\overline{\text{Busy}}$ output (RY/$\overline{\text{BY}}$) – Hardware method for detection of program or erase cycle completion
- Hardware $\overline{\text{RESET}}$ pin – Resets internal state machine to the read mode
- Erase Suspend/Resume – Supports reading or programming data to a sector not being erased
- Packaging – Hermetic Ceramic
  - 68–Lead, Low Profile CQFP(F1), 1.56"SQ x .140"max
  - 68–Lead, Dual-Cavity CQFP(F2), 0.88"SQ x .20"max (.18 max thickness available, contact factory for details) *(Drops into the 68 Lead JEDEC .99"SQ CQFJ footprint)*
- Internal Decoupling Capacitors for Low Noise Operation
- Commercial, Industrial and Military Temperature Ranges
- MIL-PRF-38534 Compliant MCMs Available

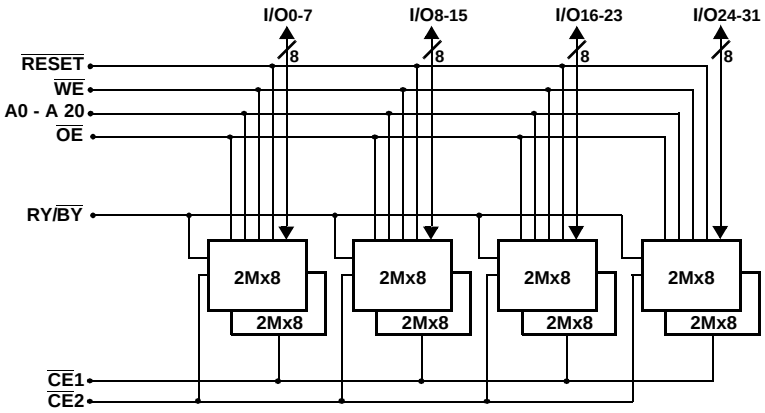
Block Diagram – CQFP(F1)



Pin Description

I/O0-31	Data I/O
A0–21	Address Inputs
$\overline{\text{WE}}$	Write Enables
$\overline{\text{CE}}$1-4	Chip Enables
$\overline{\text{OE}}$	Output Enable
$\overline{\text{RESET}}$	Reset
RY/$\overline{\text{BY}}$	Ready/$\overline{\text{Busy}}$
VCC	Power Supply
GND	Ground
NC	Not Connected

Block Diagram – CQFP(F2)



Pin Description

I/O0-31	Data I/O
A0–20	Address Inputs
$\overline{\text{WE}}$	Write Enable
$\overline{\text{CE}}$1,2	Chip Enables
$\overline{\text{OE}}$	Output Enable
$\overline{\text{RESET}}$	Reset
RY/$\overline{\text{BY}}$	Ready/$\overline{\text{Busy}}$
VCC	Power Supply
GND	Ground
NC	Not Connected

General Description

Utilizing AMD's Sector Erase Flash Memory Die, the ACT-F4M32A is a high speed, 128 megabit CMOS flash multichip module (MCM) designed for full temperature range, military, space, or high reliability applications.

The ACT-F4M32A consists of eight high-performance AMD Am29F016 16Mbit (16,777,216 bit) memory die. Each die contains 8 separately write or erase sector groups of 256Kbytes (A sector group consists of 4 adjacent sectors of 64Kbytes each).

The command register is written by bringing $\overline{WE}$ to a logic low level (V_{IL}), while $\overline{CE}$ is low and $\overline{OE}$ is high (V_{IH}). Reading is accomplished by chip Enable ($\overline{CE}$) and Output Enable ($\overline{OE}$) being logically active. Access time grades of 100ns, 120ns and 150ns maximum are standard.

The ACT-F4M32A is offered in two different hermetically sealed co-fired 68 lead ceramic packages. This allows operation in a military environment temperature range of -55°C to +125°C.

The ACT-F4M32A can be programmed (both read and write functions) in-system using the +5.0V V_{CC} power supply. A 12.0V V_{PP} is not required for programming or erase operations. The end of program or erase is detected by the RY/$\overline{BY}$ pin, $\overline{Data}$ Polling of DQ7, or by the Toggle bit (DQ6).

The ACT-F4M32A also has a hardware $\overline{RESET}$ pin. When this pin is driven low, execution of any Embedded Program Alggorithm or Embedded Erase Algorithm will be terminated.

Each block can be independently erased and programmed 100,000 times at +25°C.

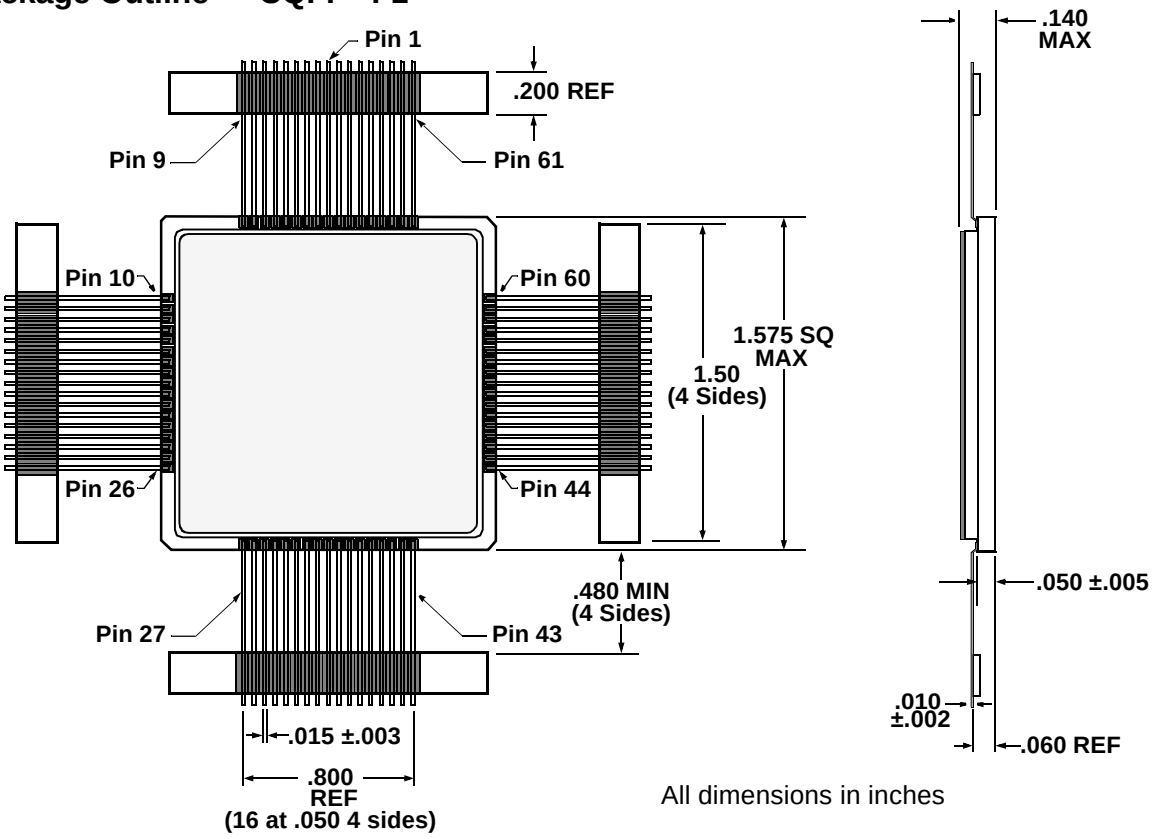
For Detail Information regarding the operation of the Am29F016 Sector Erase Flash Memory, see the AMD datasheet (Publication 18805).

Pin Numbers & Functions

68 Pins — CQFP							
Pin #	Function	Pin #	Function	Pin #	Function	Pin #	Function
1	GND	18	GND	35	$\overline{OE}$	52	GND
2	$\overline{CE}_1$	19	I/O_8	36	$\overline{CE}_4$	53	I/O_{23}
3	A_5	20	I/O_9	37	A_{17}	54	I/O_{22}
4	A_4	21	I/O_{10}	38	A_{18}	55	I/O_{21}
5	A_3	22	I/O_{11}	39	A_{19}	56	I/O_{20}
6	A_2	23	I/O_{12}	40	A_{20}	57	I/O_{19}
7	A_1	24	I/O_{13}	41	A_{21}	58	I/O_{18}
8	A_0	25	I/O_{14}	42	$\overline{RESET}$	59	I/O_{17}
9	RY/$\overline{BY}$	26	I/O_{15}	43	NC	60	I/O_{16}
10	I/O_0	27	V_{CC}	44	I/O_{31}	61	V_{CC}
11	I/O_1	28	A_{11}	45	I/O_{30}	62	A_{10}
12	I/O_2	29	A_{12}	46	I/O_{29}	63	A_9
13	I/O_3	30	A_{13}	47	I/O_{28}	64	A_8
14	I/O_4	31	A_{14}	48	I/O_{27}	65	A_7
15	I/O_5	32	A_{15}	49	I/O_{26}	66	A_6
16	I/O_6	33	A_{16}	50	I/O_{25}	67	$\overline{WE}$
17	I/O_7	34	$\overline{CE}_2$	51	I/O_{24}	68	$\overline{CE}_3$

Consult Factory for Special order: Pin 9 -NC

Package Outline — CQFP "F1"



All dimensions in inches

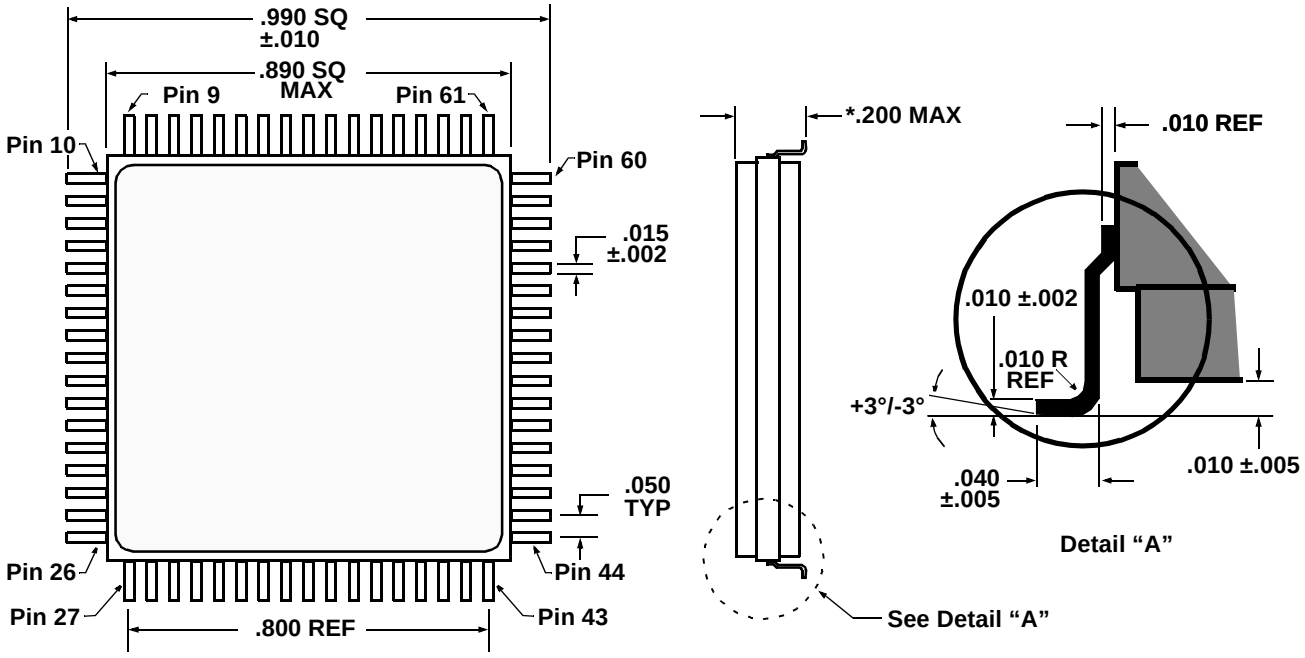
Pin Numbers & Functions

68 Pins — Dual-Cavity CQFP *(Standard Configuration)*							
Pin #	Function	Pin #	Function	Pin #	Function	Pin #	Function
1	GND	18	GND	35	$\overline{OE}$	52	GND
2	NC	19	I/O_8	36	$\overline{CE}_2$	53	I/O_{23}
3	A_5	20	I/O_9	37	A_{17}	54	I/O_{22}
4	A_4	21	I/O_{10}	38	$RY/\overline{BY}$	55	I/O_{21}
5	A_3	22	I/O_{11}	39	NC	56	I/O_{20}
6	A_2	23	I/O_{12}	40	NC	57	I/O_{19}
7	A_1	24	I/O_{13}	41	A_{18}	58	I/O_{18}
8	A_0	25	I/O_{14}	42	A_{19}	59	I/O_{17}
9	$\overline{RESET}$	26	I/O_{15}	43	A_{20}	60	I/O_{16}
10	I/O_0	27	V_{CC}	44	I/O_{31}	61	V_{CC}
11	I/O_1	28	A_{11}	45	I/O_{30}	62	A_{10}
12	I/O_2	29	A_{12}	46	I/O_{29}	63	A_9
13	I/O_3	30	A_{13}	47	I/O_{28}	64	A_8
14	I/O_4	31	A_{14}	48	I/O_{27}	65	A_7
15	I/O_5	32	A_{15}	49	I/O_{26}	66	A_6
16	I/O_6	33	A_{16}	50	I/O_{25}	67	$\overline{WE}$
17	I/O_7	34	$\overline{CE}_1$	51	I/O_{24}	68	NC

Consult Factory for Special order: Pin 38 -NC

Package Outline — Dual-Cavity CQFP "F2"

Top View



***.180 MAX available, call factory for details**

All dimensions in inches

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Ordering Information

Model Number	Screening	Speed	Package
ACT–F4M32C–100F1C	Commercial (0°C to +70°C)	100 ns	1.56"sq CQFP
ACT–F4M32A–100F2C	Commercial (0°C to +70°C)	100 ns	.88"sq CQFP
ACT–F4M32C–100F2C	Commercial (0°C to +70°C)	100 ns	.88"sq CQFP
ACT–F4M32A–100F1C	Commercial (0°C to +70°C)	100 ns	1.56"sq CQFP
ACT–F4M32C–100F1I	Industrial (-40°C to +85°C)	100 ns	1.56"sq CQFP
ACT–F4M32A–100F2I	Industrial (-40°C to +85°C)	100 ns	.88"sq CQFP
ACT–F4M32C–100F2I	Industrial (-40°C to +85°C)	100 ns	.88"sq CQFP
ACT–F4M32A–100F1I	Industrial (-40°C to +85°C)	100 ns	1.56"sq CQFP
ACT–F4M32C–100F1M	Military (-55°C to +125°C)	100 ns	1.56"sq CQFP
ACT–F4M32A–100F2M	Military (-55°C to +125°C)	100 ns	.88"sq CQFP
ACT–F4M32C–100F2M	Military (-55°C to +125°C)	100 ns	.88"sq CQFP
ACT–F4M32A–100F1M	Military (-55°C to +125°C)	100 ns	1.56"sq CQFP

Part Number Breakdown

ACT– F 4M 32 A– 100 F1 M

Aeroflex Circuit Technology

Memory Type

S = SRAM
F = FLASH EEPROM
E = EEPROM
D = Dynamic RAM

Memory Depth, Locations

Memory Width, Bits

Pinout Options

F2 - A = One $\overline{WE}$, RY/$\overline{BY}$ access on Pin 38 - Standard pinout
F2 - C = RY/$\overline{BY}$ internally tied - Optional pinout
F1 - A = One $\overline{WE}$, RY/$\overline{BY}$ access on Pin 9 - Standard pinout
F1 - C = RY/$\overline{BY}$ internally tied - Optional pinout

Memory Speed, ns (+5V Vcc)

Screening

C = Commercial Temp, 0°C to +70°C
I = Industrial Temp, -40°C to +85°C
T = Military Temp, -55°C to +125°C
M = Military Temp, -55°C to +125°C, Screened *
Q = MIL-PRF-38534 Compliant/SMD if applicable

Package Type & Size

Surface Mount Packages

F1 = 1.56"SQ 68 Pin CQFP
F2 = .88"SQ 68 Pin Dual-Cavity CQFP

* **Screened to the individual test methods of MIL-STD-883**

Specifications subject to change without notice

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